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Riess

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(54) **PB-FREE DEFORMING/PARTIALLY FRAGMENTING PROJECTILE WITH A DEFINED MUSHROOMING AND FRAGMENTING BEHAVIOR**

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(57) **ABSTRACT**

The invention relates to a Pb-free deforming/partially fragmenting projectile with a projectile body. In order to improve the killing effect of the projectile, the projectile has a fragmenting core according to the invention. The projectile body is equipped with a bore which is arranged on the longitudinal axis, extends from the tip of the projectile body, and extends into the interior, and the projectile body tip, which faces away from the projectile base has a bevel which extends from the outer circumference of the projectile body to the bore and runs at an acute angle to the longitudinal axis. The fragmenting core has a cylindrical part and a head part. The cylindrical part is arranged in the bore, and the head part protrudes out of the bore and has a support surface which is
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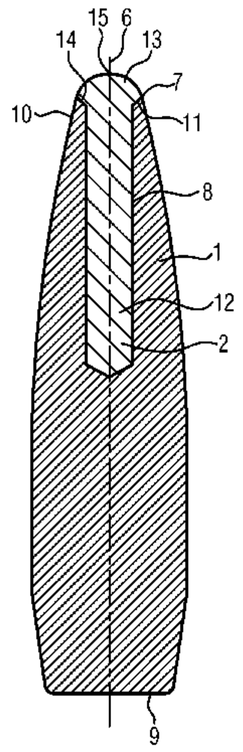

adapted to the bevel in the projectile body and together with the support surface rests on the bevel of the projectile body. The head part has a rounded tip which forms the tip of the projectile.

10 Claims, 3 Drawing Sheets

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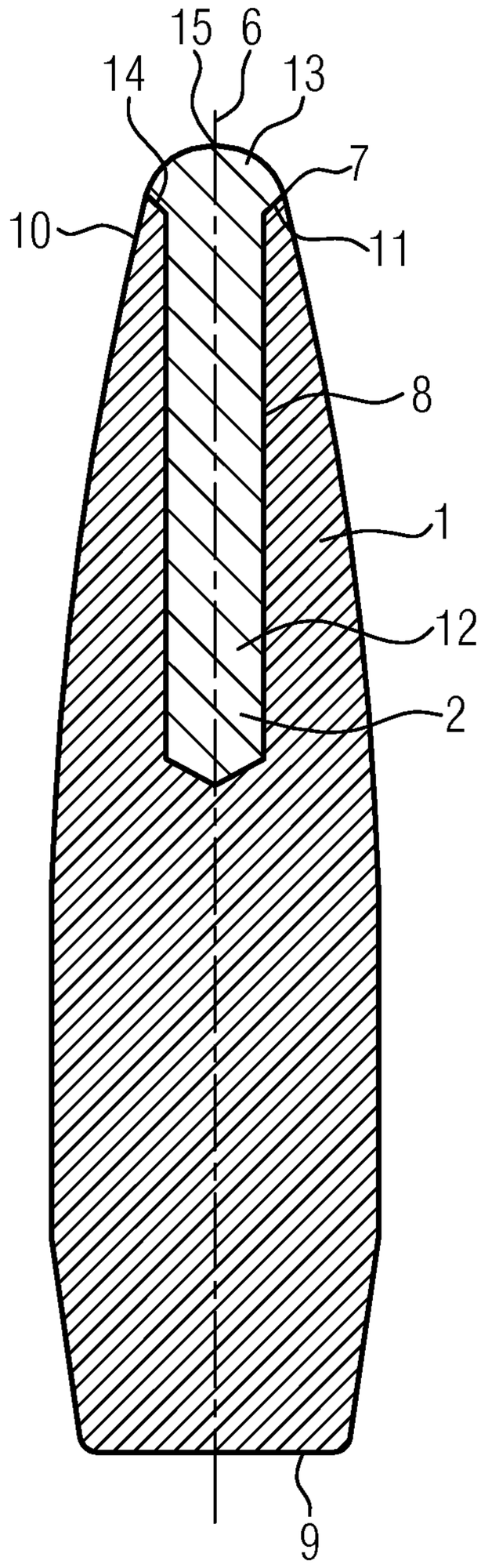

FIG. 1

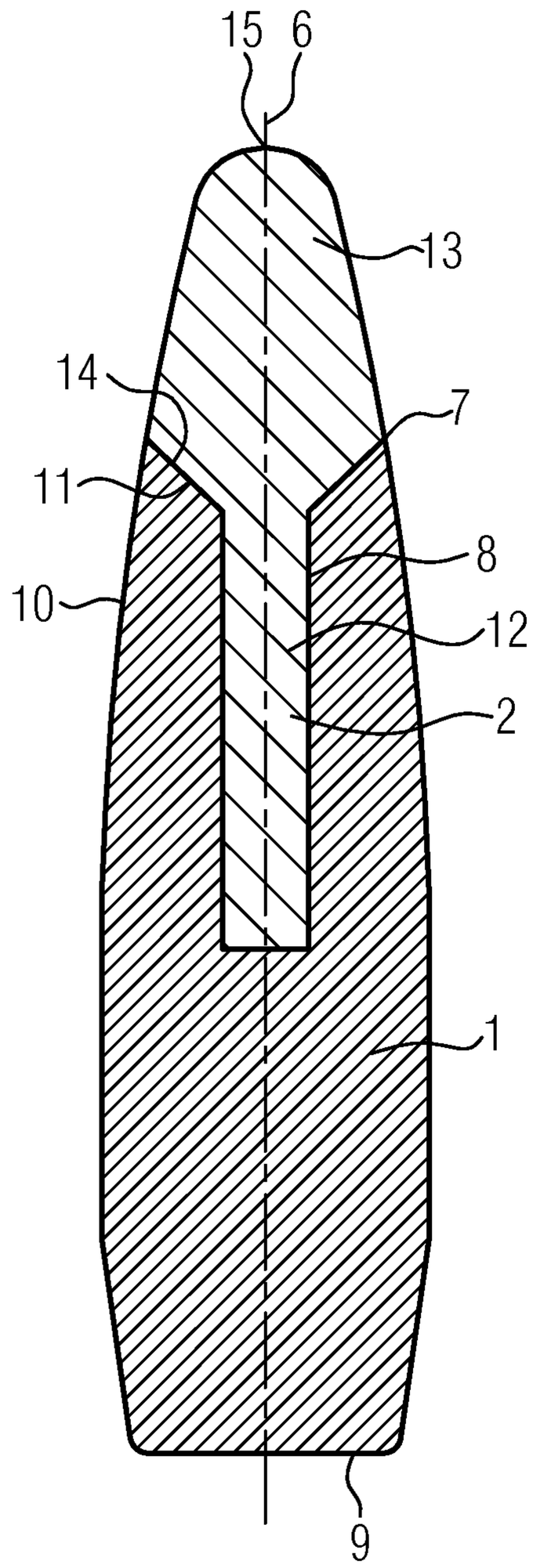

FIG. 2

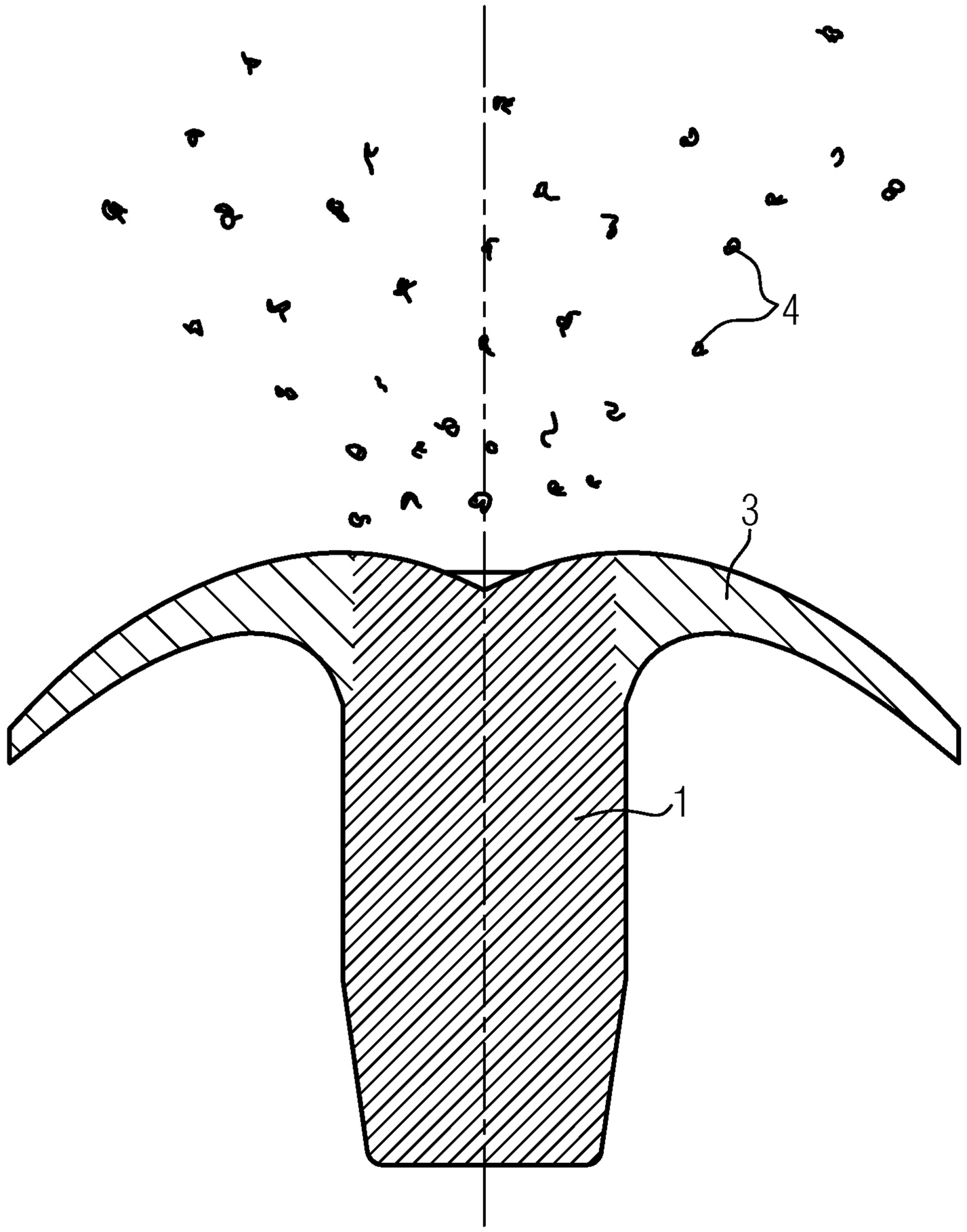

FIG. 3

PB-FREE DEFORMING/PARTIALLY FRAGMENTING PROJECTILE WITH A DEFINED MUSHROOMING AND FRAGMENTING BEHAVIOR

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a U.S. national phase application filed under 35 U.S.C. § 371 of International Application No. PCT/EP2015/052778, filed Feb. 10, 2015, designating the United States, which claims priority from German Patent Application No. 10 2014 001 612.9, filed Feb. 10, 2014, which are hereby incorporated herein by reference in their entirety for all purposes.

BACKGROUND OF THE INVENTION

Field of the Invention

The invention relates to a lead-free deforming/partially fragmenting projectile having a projectile body. The invention is based upon a lead-free deforming/partially fragmenting projectile having a projectile body in such a way that the killing effect of the projectile is improved. The invention has a lead-free deforming/partially fragmenting projectile.

SUMMARY OF THE INVENTION

The fragmentable core is deformed on impact of the projectile with the target body and initiates the mushrooming of the projectile due to the fact that the projectile has a fragmentable core, wherein a bore is arranged on the longitudinal axis, extends from the tip of the projectile into the interior, is created in the projectile body, and the upper part of the projectile body which faces away from the base of the projectile has a beveled surface forming at an acute angle with the longitudinal axis and extends from the outside circumference of the projectile body to the bore. The fragmentable core has a cylindrical part and a head part. The cylindrical part is located in the bore and the head part protrudes out of the bore and has a support surface, which conforms to the beveled surface in the projectile body, and the head part has a rounded tip which forms the tip of the projectile. Therefore, the fragmentable core is exposed, fragments in the target body at predetermined breaking points to form multiple fragments, and damages vital organs at a distance from the shot channel. The deformed projectile body releases energy into the target body and creates the exit wound. The fragmentable part of the projectile is always defined due to the fact that the projectile body, which has a stable mass, does not lose any mass in its passage through the target body.

The weight of the fragmentable core is preferably between 3% and 30% of the weight of the projectile. The greater the weight of the fragmentable core relative to the weight of the projectile, the greater is the damage is to vital organs. If the weight of the fragmentable core amounts to 3% of the projectile weight, then there is little depth effect. However, if the weight of the fragmentable core is 30% of the projectile weight, then the depth effect is great.

The projectile body is preferably made of a deformable lead-free material or alloys thereof and is preferably made of Cu or CuZn.

The fragmentable core is preferably made of a lead-free fragmentable material, advantageously tin or pressed tin granules.

In one embodiment, the fragmentable core is provided with predetermined breaking points that define the fragments when breaking occurs at the breaking points after impact of the projectile. A preferred embodiment of a core permeated with predetermined breaking points is described in DE 10 2012 023398 A 1.

The projectile body determines the mushrooming behavior of the projectile. This takes place through the material, the shaping on the inside and/or outside with or without predetermined breaking points on the inside or outside or both. Any readily deformable lead-free material or alloys may be used as the material, e.g., Cu or CuZn.

The fragmentable core determines the response of the projectile and the defined fragmentation of the projectile core. The material is made of a lead-free readily fragmentable material such as Sn, pressed granules or cores permeated with predetermined breaking points as described in DE 10 2012 023398 A 1.

Mechanism of Action

The mushrooming and defined fragmentation of the projectile according to the invention in the target body, in particular a hunting projectile in a game animal's body after penetration into the same determines the release of energy of the projectile and thus the effect of the shot. To improve the killing effect of the deformation projectile, a fragmentable core is introduced into the deforming projectile. After impact of the projectile with the target body, the core deforms and starts the mushrooming of the projectile. This in turn exposes the fragmentable core, which fragments in the target body at the breaking points and damages vital organs at a greater distance from the shot channel. The deformed projectile body continues to release energy in the target body and creates the exit wound. Since the projectile body, which has a stable mass, does not lose any mass in its passage through the target body, the fragmentable part of the projectile is always defined. The fragmentable part (see the drawings) may amount to between 3% and 30% of the projectile weight. The greater the fragmentation in percentage relative to the projectile weight, the greater the damage is to vital organs.

The fragmentable part of the projectile weight is preferably 3% to 30%.

EXAMPLE

Projectile body 97% high release of energy
Fragmentable core 3% low depth effect
Projectile body 70% low release of energy
Fragmentable core 30% great depth effect

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows a cross section of an embodiment of a bullet in accordance with the invention.

FIG. **2** shows a cross section of another embodiment of a bullet in accordance with the invention.

DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** shows an embodiment of a lead-free deforming/partially fragmenting projectile according to the invention, having a projectile body **1** and a fragmentable core **2** with a defined mushrooming and fragmenting behavior. In the embodiment shown here, the amount by weight of the fragmentable core **2** of the projectile weight is 3%.

A bore is arranged on the longitudinal axis **6** and extends from the tip **7** of the projectile body **1** into the interior of the projectile body **1**. The upper part of the projectile body **1** faces away from the base **9** of the projectile and has a bevel **11** forming at an acute angle with the longitudinal axis **6**, extends from the outside circumference **10** of the projectile body **1** to the bore **8**. The fragmentable core **2** has a cylindrical part **12** and a head part **13**, with the cylindrical part **12** being in the bore **8** and the head part **13** protruding out of the bore **8** and has a support surface **14**, which conforms to the beveled surface **11** in the projectile body **1**. With the support surface **14**, the head part **13** is positioned on the beveled surface **11** of the projectile body **1**. The head part **13** has a rounded tip **15**, which is the tip of the projectile.

FIG. **2** shows a cross section of another embodiment of a lead-free deforming/partially fragmenting projectile according to the invention, having a projectile body **1** and a fragmentable core **2** with a defined mushrooming and fragmenting behavior which produces multiple fragments as shown. In the embodiment shown here, the amount by weight of the fragmentable core **2** in the projectile weight is 30%. The same reference numerals also denote the same objects as in FIG. **1**.

FIG. **3** shows a cross section a bullet in accordance with the invention illustrating the mushrooming effect **3** of the projectile body **1** and the defined fragmentation **4** of the fragmentable core **2** of the projectile in the target body.

The invention claimed is:

1. A lead-free partially deforming and partially fragmenting projectile comprising:

a projectile body configured for mounting in a cartridge including a fragmentable core, a base, a bore disposed on a longitudinal axis of the body and which extends from a tip of the projectile body into an interior of the projectile body, the tip facing away from the base and including a beveled surface which forms an acute angle with the longitudinal axis and which extends from an outer circumference of the projectile body to the bore,

the fragmentable core having a cylindrical part and a head part which protrudes out of the bore and has a support surface conforming to the beveled surface and rests on the support surface and the head part has a rounded tip which is the tip of the projectile; and wherein

the fragmentable core is deformable and is configured to start mushrooming of the projectile body upon impact with a game animal body after being fired from the cartridge, weighs between 3% and 30% of a weight of the projectile body, consists of tin or pressed tin granules and has predetermined breaking points formed into the core prior to mounting of the projectile body in the cartridge, the breaking points of the core are configured to break upon the impact with the game animal body into fragments which separate from the projectile body into the game animal body while the projectile body passes completely through the game animal body.

2. A projectile in accordance with claim **1**, wherein the body consists of deformable lead-free material or alloys thereof.

3. A projectile in accordance with claim **2**, wherein the body consists of Cu or CuZn.

4. A projectile in accordance with claim **3**, wherein the bore has only a cylindrical surface.

5. The projectile in accordance with claim **3**, wherein the bore is entirely filled with the core.

6. A projectile in accordance with claim **2**, wherein the bore has only a cylindrical surface.

7. The projectile in accordance with claim **2**, wherein the bore is entirely filled with the core.

8. A projectile in accordance with claim **1**, wherein the bore has only a cylindrical surface.

9. The projectile in accordance with claim **8**, wherein the bore is entirely filled with the core.

10. The projectile in accordance with claim **1**, wherein the bore is entirely filled with the core.

* * * * *